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by

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Macro-scaled Microcredit and Constraints on Household Business Development: Evidence from Northern Thailand*

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Abstract

This paper studies impacts of One-Million-Baht Village Fund program on entrepreneurial activities of households in northern Thailand. In addition to being one of the largest-scaled microfinance programs to date, the implementation of the Village Fund program provides us with an exogenous variation in the availability of microcredit per household that can be used to form an instrumental variable. We apply our unique dataset, containing the instrument and a precise measure of the extent to which household businesses are financially constrained, to estimate Probit models that are subject to the problem of endogenous borrowing decisions. We find evidence for the positive impacts of the Village Fund program on relieving financial constraints faced by household businesses, but the impacts on business startup rates are not significant. Our findings offer policy implications on improving effectiveness of microfinance programs in promoting household businesses.

Keywords: Entrepreneurship; Financial constraints; Microfinance; Village funds

JEL Classifications: G21; G51; O16

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1 Introduction

Common characteristics of developing economies include low income, high inequality, and limited access to financial markets. Financial frictions prevent households with high entrepreneurial ability but low wealth from starting or expanding their businesses, which in turn, leads to increasing inequality. Microfinance programs are often regarded as potential solutions to this problem. By successfully providing the much-needed credits to the poor, microfinance programs should help promote entrepreneurial activities among these households, increase their income, and lift them out of poverty. However, previous studies on the impacts of microfinance programs have yet to provide conclusive results.

In this paper, we take advantage of the unique combination of a novel dataset and a distinctive real-world microfinance program to evaluate the impacts of microcredits on households entrepreneurial activities. The dataset allows us to directly observe whether household businesses are financially constrained, while Thailand's One-Million-Baht Village Fund (henceforth, Village Fund or VF) program—the microfinance program considered herein—offers a perfect setting for examining the impact of a non-randomized-control-trial experimental program. As the Village Fund program is one of the biggest microfinance programs to date and designed as a macro-scaled policy to cover all villages nationwide, there is no concern on typical endogeneity that may arise from reversed causality problem when a policy is initiated in response to a problematic targeted group. Besides, its special way of implementation provides us with an exogenous variation on the availability of microcredits per household that can be used to construct an instrument to address the endogeneity problem caused by selection bias.

This paper contributes to the literature by analyzing the mechanisms through which a microfinance program can improve well-being of households, rather than focusing on outcomes such as income or consumption levels. We find that the VF program helps relax financial constraints faced by the household businesses in our dataset. However, we also find that the VF program does not increase the likelihood that the households in our sample start a business. This finding also contributes to the limited pool of studies on the impacts of microfinance programs on new business startups.

The remainder of the paper is structured as follows. Section 2 provides a review of related literature. Section 3 describes the dataset used in this paper and its stylized facts. Section 4 illustrates the empirical strategy for our study. Section 5 analyzes the results

on impacts of the Village Fund program on financial constraints faced by the household businesses and on new business startups. Section 6 concludes the study and discusses policy implications.

2 Related Literature

In an economy with a perfect financial market, the likelihood that an individual will start a business should depend only on the entrepreneurial ability of that person. Without financial frictions, potential entrepreneurs with a viable business idea would be able to borrow to finance their business expenses, if necessary, and their wealth should have no effect on the probability of starting a business. However, several prior studies have documented financial constraints in practice and found several factors other than ability that are related to business startups and entrepreneurial activities.

2.1 Financial Constraints and Entrepreneurship

Occupational-choice models with financial frictions imply that too low wealth hinders potential capable entrepreneurs in starting a business or operating their business at the optimal scale (Evans and Jovanovic, 1989; Lloyd-Ellis and Bernhardt, 2000). This theoretical prediction has been confirmed by many empirical works that exhibit the existence of relationships between wealth and entrepreneurial activities.

First, a number of studies show the positive relationship between a household's wealth and propensity to start a business, and these results are often utilized as evidence of borrowing constraints. For example, Evans and Jovanovic (1989), Evans and Leighton (1989), Fairlie (1999), and Kan and Tsai (2006) show that the probability that a household in the United States would start a business is positively correlated with its wealth. Johansson (2000) and Paulson and Townsend (2004) report similar results among households in Finland and Thailand, respectively.

Secondly, the positive effect of wealth on entrepreneurial activities is consistent with the studies showing that positive liquidity shocks that relax financial constraints can increase business startups. Holtz-Eakin, Joulfaian, and Rosen (1994b) and Blanchflower and Oswald (1998) find that receiving inheritances increases the probability of starting a

business for households in the United States and the Great Britain, respectively.¹ Using Swedish micro-data, Lindh and Ohlsson (1996) find that winning a lottery and receiving inheritances increase the probability of an individual being self-employed.

Still, a deeper investigation into wealth distribution of households provides mixed results. Hurst and Lusardi (2004) finds that the relationship between wealth and entrepreneurial activities of households in the United States is nonlinear. The positive relationship between wealth and entrepreneurial activities is primarily driven by households in the top 5% of the wealth distribution, not the poor households. On the contrary, Nykvist (2008) applies the similar method to Swedish household data and finds the existence of a positive relationship between wealth and entrepreneurial activities along the entire wealth distribution. Fairlie and Krashinsky (2012) re-examines the issue initiated by Hurst and Lusardi (2004) but classifying population into recent job losers and the others. They find positive effect of wealth for both groups throughout the entire wealth distribution.

2.2 Policy Implementation and Evaluation

Owing to the conceptual framework and empirical supports of the effect of wealth on business startups and entrepreneurship, there have been many attempts on policy designs to enhance entrepreneurial activities for those with lower wealth profiles. In a sense, such policy could help an economy re-allocate financially constrained households with business capability to the right job; thus, improving the economy's overall productivity. Moreover, lifting constraints that hinder business setups of some households could help improve their living standards.

The early success of Grameen Bank, both in terms of high repayment rate and reaching out to the poorest of the poor, helps promote microfinance programs around the world, especially those with joint-liability credit programs. However, only recently have there been studies on the impacts of microfinance programs on poverty reduction and increasing entrepreneurships.

Early works on the evaluation of microfinance programs include Pitt and Khandker

¹In addition, Holtz-Eakin, Joulfaian, and Rosen (1994a) also find that receiving inheritances increases the survival rate of the existing household's business in the United States. Taylor (2001) investigates the different impacts of various windfall gains on the probability of starting a business and the survival rate of existing business of households in the Great Britain.

(1998) and Khandker (2005), which evaluate the impact of Grameen Bank and two other microfinance programs in Bangladesh. Pitt and Khandker (1998) document that the microfinance programs increase households' expenditures and women's non-land fixed assets and that the effects are larger if the program participants are women. Khandker (2005) also reports that the microfinance programs help reduce poverty, especially for female participants. More recently, Augsburg et al. (2015) and Crépon et al. (2015) study the impact of microcredit programs in Bosnia and Morocco, respectively. The former study finds that the program increases self-employment and profits from household businesses. However, consumption and savings decline, and there is no significant effect on household income. The latter finds that microcredit increases investment and profits from household businesses but has no effect on income or consumption.

There exists a common belief that women have less access to credit than men, especially in developing economies. This belief, together with prior findings that the effects of microfinance programs are larger for female participants, leads to women-targeting microfinance programs in many countries. Recent studies on these programs include Angelucci, Karlan, and Zinman (2015) for Mexico, Attanasio et al. (2015) for Mongolia, Bandiera et al. (2017) for Bangladesh, Banerjee et al. (2015) for India, Coleman (1999, 2006) for Thailand, and Tarozzi, Desai, and Johnson (2015) for Ethiopia. While microfinance programs successfully increase female entrepreneurship in some countries (Attanasio et al., 2015; Bandiera et al., 2017), they fail to achieve the same results in other countries (Banerjee et al., 2015; Tarozzi, Desai, and Johnson, 2015). More interestingly, these studies reveal unfortunate facts that microfinance programs have little impact on business profits (Angelucci, Karlan, and Zinman, 2015; Attanasio et al., 2015; Banerjee et al., 2015; Tarozzi, Desai, and Johnson, 2015) and household's consumption (Attanasio et al., 2015; Banerjee et al., 2015). In addition, the impacts also differ across socio-economic statuses. On the one hand, Coleman (1999) reports that the microfinance program in his study has little overall impact on household's wealth, savings, borrowing, or production. On the other hand, Coleman (2006) finds positive impacts for the committee members of the microfinance institution but not for ordinary members.

These attempts on policies designs vary greatly in terms of implementations and evaluation methods. As mentioned above, some are implemented in form of credit provision, either in terms of formal or informal lending channels, whereas the others rely on

transfers. More importantly, there is an issue of sound methodology for evaluation of the policies. Many of the prior studies rather measure the impact indirectly by looking at ultimate outcomes of intervention such as consumption, income, revenue, or profit. However, the studies to gain insight to direct effects or mechanism toward to the ultimate outcomes are still limited to investment and business startups. There have been yet to explore the direct effect on relaxing financial constraints of household businesses which is another plausible explanation on mechanism to reach the outcomes. Herein, we also investigate this mechanism by using direct household surveys.

As discussed in Khandker (2005) and Coleman (2006), there are concerns of endogeneity problem when evaluating microfinance programs due to two issues. Firstly, households that borrow from microfinance program might be different from those who do not. For example, households with more entrepreneurial ability might be more likely to apply for loans, but these households will also be more likely to start a business even without any loan from a microfinance program. Such phenomenon creates the problem of self-selection bias that causes endogeneity. Secondly, microfinance programs often target the areas perceived to have the most viable customers (impacts are overestimated) or the areas which are poorer than average (impacts are underestimated); thereby, causing simultaneity from reversed causality problem.

To alleviate endogeneity problem, most of the studies related to these intervention programs are based on a randomized control trial (RCT). Nonetheless, RCT has been criticized for its limitation on external validation (see, for example, Peters, Langbein, and Roberts, 2018). Alternatively, a method which is less subject to the external validity issue is based on a natural experiment. However, this method does not prevail in the literature because intervention programs satisfying the conditions for a natural experiment are rare. To the best of our knowledge, there have been the only natural-experimental program evaluated in the literature, namely the targeted bank-lending program in India studied in Banerjee and Duflo (2014), but the emphasis is on firms rather than households.

For other microfinance programs, the evaluation method must address the problems of self-selection bias and reversed causality as mentioned above. For this reason, Thailand's One-Million-Baht Village Fund program stands out as a good option. First, all villages in Thailand are eligible to set up a village fund. In addition, 92% of the villages in Thailand have their village funds set up within the first two years (Boonperm, Haughton,

and Khandker, 2013). Therefore, the concern about endogenous program placement that causes reversed causality issue is unlikely. Secondly, the fact that each of the village funds receives the same amount of seeding fund regardless of its village's size provides exogenous variation in term of availability of village fund per household. Therefore, we can construct an instrumental variable from village sizes to address the self-selection issue.

2.3 Thailand's One-Million-Baht Village Fund Program

Thailand's One-Million-Baht Village Fund program is one of the three main policies in the campaign of the winning party of the 2001 national election. The objective of the program is to provide individuals and small enterprises with the much-needed capital to start and expand their businesses which, in turn, create jobs and bring income to their communities. Shortly after the official announcement of the election result, the newly elected government confirms the goal to create 74,881 village funds in total (for 71,504 villages and 3,237 communities).

Existing studies on the effectiveness of the VF program typically focus on the final outcomes such as income or consumption and often find contradicting results. Chandoevrit and Ashakul (2008) and Boonperm, Haughton, and Khandker (2013) use the propensity score matching technique to evaluate the effect of the VF program on households' income and consumption. The former paper analyzes a panel sub-sample of the Socio-Economic Surveys (SES) and does not find any evidence that the VF program increases either households' income or consumption. On the other hand, employing the SES panel sub-sample together with the whole SES sample, the latter finds that the village funds help increase both consumption and, to the lesser extent, income.

Menkhoff and Rungruxsivorn (2011) and Kaboski and Townsend (2012) use the number of households per village as an instrumental variable, as in our paper, to control for the self-selection bias. Kaboski and Townsend (2012) shows that the VF program increases short-term borrowings, consumption level, and income growth. Although no significant impact on investment is documented, Kaboski and Townsend (2012) report that the VF program also increases households' business profits and wages. Possibly closest to our study is Menkhoff and Rungruxsivorn (2011), which discover that the VF program helps relax households' credit constraints and better provides poor households with access to credit than do formal financial institutions. However, the constraints

investigated in their study is different from those herein. While their study looks at general credit constraints, ours emphasizes on the business-development aspect. Menkhoff and Rungruxsirivorn (2011) labels a household as credit constrained if it has ever applied for a loan but rejected or granted less than the requested amount, regardless of loan purpose. In contrast, when investigating the impact on financial constraint, we restrict our sample only to the households with a business and define a household as financially constrained if it reports that its business would be more profitable if expanded. For one case, if business operation can be expanded to retrieve higher profit but with a requirement of sizeable external funds, a household may decide not to apply for credit to expand its business but still utilize VF loan for consumption. In such case, the data would reveal that the VF program helps lessen credit constraint by the definition of Menkhoff and Rungruxsirivorn (2011), even though the VF microcredit is too small to yield an impact on easing financial constraint for business development. Hence, our choice of the constraint measurement and sample restriction allows us to clean out some irrelevant aspects and truly estimates the role of microcredit particularly on business development.

In summary, our paper is the only non-RCT study on a microfinance program that tests the effect of microcredit on business startups and relaxation of financial constraints on profitable business expansion which are important mechanisms toward better outcome of well-being. The fact that our more-sensible measurement of financial constraints is derived from the direct household survey is an additional contribution to the literature.

3 Data and Stylized Facts

In this paper, we employ data from the baseline survey of the extended Townsend Thai Project in two Northern provinces, namely Phrae and Petchabun, which to the best of our knowledge have not been used in any other prior studies. The survey, conducted in 2004, collects data at the household level by using conversational interview method of survey to solicit information according to the Project's questionnaire. It covers 240 households derived from stratified simple random sampling (SRS) method. More precisely, the survey randomly selects eight villages in each province, before conducting SRS to select 15 households per village.

Not only does the sampling method is designed to well serve empirical studies, but

the survey timing and contents are also suitable for our study. Firstly, Thailand's Village Funds are launched nationwide starting in 2001, which is merely a few years before the survey time. Hence, the period is not too long for the impact of the Village Funds, if existing, to be much contaminated by other significant policies or interventions. More importantly, the period is not too short for households to reap benefit from the funds and take entrepreneurial actions, including business startups and expansion. This allows us to observe such actions between the period of the launch of the Village Funds and the survey time. Out of 240 households in our sample, 58 households are business owners in 2004, out of which 20 households start the business in 2001 or later. In other words, more than one-third of the households running business in 2004 start up after the initiation of Village Funds. Hereafter, we will refer to these households as the "new-business" households, and the other 38 business owners as the "old-business" households.

Secondly, in term of contents, the survey includes borrowing and business modules. The borrowing module collects detailed information at loan-level, including amount and provider. Hence, we can distinguish between microcredit that each household receives from the Village Fund program and from the other sources of liabilities as well as observe variation in credit sizes across households. In the business module, the survey explicitly asks each of the business-owning households whether its business would be more profitable if expanded and whether it is in a process of expanding at the moment. Therefore, we could exploit the answer to these questions as a direct measure of whether each of the households experiences financial constraint on its business development. The households that envision profitability associated with business expansion but not in the process are counted as the financially constrained households in this study.² In fact, the survey also asks for the reasons not to expand business if perceived to be more profitable. However, we treated the reasons related to lack of any marketable resources, including land and labor, as financial constraint as well, inasmuch as households can rent or purchase with sufficiently available funds. Overall, we find that 30 percent of the new-business households and more than a quarter of the old-business households are financially constrained.

Interestingly, the old businesses tend to be smaller than the new ones, as reflected by the distribution of the numbers of workers. As, illustrated in Table 1, the proportion

²There are only two households answering that their businesses would be more profitable if expanded and at the same time in the process of expanding their businesses. Herein, we do not consider them as constrained, but none of the main results change if we consider these households as constrained.

of the old-business households with 1–2 workers is relatively more than that of the other group. Moreover, the data showed in the table reveal that, overall, old businesses have more paid workers and less family-member workers relative to the new businesses.

Table 1: Business characteristics

Business characteristics	New business	Old business
Number of workers		
1–2	65%	74%
3–5	25%	21%
6+	10%	5%
Percentage of workers		
who are family members	80%	75%
who are paid for work	18%	24%
Number of business households	20	38

Note: New-business households are households with a business started in 2001 or after. Old-business households are households with a business started in 2000 or before.

Source: Townsend Thai Project.

We next look into characteristics of the households in our dataset. As reported in Table 2, there is no difference in household size between business and non-business households. However, business households seem to have younger and better-educated heads, earn higher income, and accumulate more wealth. These distinctive patterns are similar to what Paulson and Townsend (2004) find for Thai households in the Central and the Northeast. Looking deeper within the group of households with a business, we see that new-business households have younger and better-educated heads, but lower income, compared to old-business households.

As mentioned above, households with a business seem to enjoy higher wealth levels.³ More interestingly, new-business households have on average higher wealth than non-business households even in 2000 when both groups did not own a business. This stylized fact revealed by our dataset is nonetheless consistent with the occupational-choice model with financial constraints developed by Buera (2009). The model predicts that low-wealth non-business households with high entrepreneurial ability should save

³Household wealth is measured as the value of fixed assets including land, agricultural assets, business assets, and household assets.

or accumulate more wealth for eventually starting up a business, compared with lower-capability households that will never become entrepreneurs. Empirically, Buera (2009) also looks at the saving rates of new entrepreneurs in the United States during five years prior to their business startup and confirms that their saving rates are higher than those of non-business households.

Table 2: Household characteristics

Household characteristics	No business	New business	Old business
Number of household members (median)	4	4	4
Number of working-age members (median)	2	3	2
Age of household head (median)	53.5	46.5	48.5
Education level of household head (%)			
Less than primary education	77%	40%	63%
Primary education	16%	35%	24%
Secondary education	2%	5%	3%
Vocational school	4%	5%	3%
University	1%	15%	8%
Net income (1,000s of baht)			
Mean	72	119	167
Median	56	70	140
Wealth in 2004 (1,000s of baht)			
Mean	615	1,232	1,296
Median	464	820	783
Wealth in 2000 (1,000s of baht)			
Mean	554	950	1,098
Median	423	578	665
Number of households	182	20	38

Note: No-business households are those without any business at the time of the survey. New-business households are those with a business started in 2001 or after. Old-business households are those with a business started in 2000 or before. Household wealth is measured as the value of fixed assets. The overall pictures do not change if we use per-capita levels income and wealth instead.

Source: Townsend Thai Project.

Table 3 shows households' participation in the financial market by business status. Panel A of Table 3 reports the percentages of households which have savings at different types of financial institutions. We find that business households participate more actively in the formal financial market. While more than one-third of business households

have savings at commercial banks⁴, less than one-fifth of non-business households do so. Panel B of Table 3 reports the percentage of households with loans from different types of lenders. Old-business households are significantly more likely to have loans from commercial banks. On the other hand, new-business households seem to rely more on loans from informal money lenders. Panel C of Table 3 reports the percentage of households that are customers of commercial banks and the BAAC in 2000. Remarkably, new-business households were twice more likely to be customers of commercial banks than no-business households in 2000, even though neither group owns a business at that time.⁵ This finding provides suggestive evidence on the role of financial access in business startups.

Table 3: Financial participation by business status

Financial participation	No business	New business	Old business
<i>Panel A: Percentage of households that have savings at</i>			
BAAC	58%	55%	63%
Commercial banks	18%	35%	34%
Agricultural cooperatives	9%	10%	8%
<i>Panel B: Percentage of households that have loans from</i>			
Village funds	62%	50%	74%
BAAC	54%	55%	47%
Commercial banks	1%	0%	11%
Agricultural cooperatives	11%	10%	8%
Money lenders	6%	10%	0%
<i>Panel C: Percentage of households that, in 2000, are customers of</i>			
BAAC	47%	40%	37%
Commercial banks	18%	35%	39%

Note: No-business households are those without any business at the time of the survey. New-business households are those with a business started in 2001 or after. Old-business households are those with a business started in 2000 or before.

Source: Townsend Thai Project.

⁴Commercial banks include the state-owned Government Savings Bank.

⁵This finding is consistent with the results in Paulson and Townsend (2004), though both studies use data of households from different regions of Thailand and almost a decade apart.

4 Methodology

To examine how microcredit supplied by Thailand’s Village Fund program affects household business development, we focus on two dimensions: the effect on business startups and on financial constraints relaxation. Since almost all of the households in our sample have just one business, and the time scope to study the effect is not very long, there is insufficient variation in term of the number of business startups per household. Instead, we define the first dependent variable for our study as whether or not a household has become a new business owner since the launch of Thailand’s Village Funds program in 2001. Similarly, our second dependent variable—a measure of financial constraint on a household business—is based on the household’s answer to the yes-or-no question in the extended Townsend Thai survey as mentioned earlier. Therefore, both of the dependent variables in our study are dummies, for which binary-choice models are appropriate. Herein, we rely on the mainstream literature to base our analysis on the Probit models as follow:

$$Startup_i = \mathbb{I}(\beta^s VF_i + \mathbf{\Gamma}^s \mathbf{X}_i + \epsilon_i^s \geq 0) \quad (1)$$

$$Constrained_i = \mathbb{I}(\beta^c VF_i + \mathbf{\Gamma}^c \mathbf{X}_i + \epsilon_i^c \geq 0) \quad (2)$$

where $\mathbb{I}(\cdot)$ denotes the indicator function for whether the containing statement is true, and the error terms ϵ_i^s and ϵ_i^c independently follow Standard Normal distributions.

Model (1) is for studying the effect of microcredit from the macro-scaled village fund on the probability that a household starts a new business. In this model, we restrict our sample only to the households that do not own any business in 2000. The variable $Startup_i$ is a binary variable equals one if household i in this restricted sample starts a new business during the period between the launch of the village fund program in 2001 and the survey time in 2004. The sample used to study the impact of the village fund on the probability of facing financial constraint in Model (2) is however restricted to the households with a business at the point of survey in 2004. The variable $Constrained_i$ is the dummy for households reporting that its business would be more profitable if expanded. In both models, VF_i captures the value of household i ’s loans from the village-fund microcredit program, and \mathbf{X}_i is the vector of control variables for household i including the characteristics of household head, the number of working-age members, household wealth, clientship of financial institutions, and whether household i has relatives living

in the same village.

It is however important to note that the models may be subject to endogeneity problem, particularly from reversed causality. First of all, if business is highly profitable, business-running households will enjoy higher wealth; thus, causality could also run from business startup to wealth. Second of all, business operations may generally be eased with financial services or products from financial institutions, such as saving and credit, causing more likelihood for households with a business to be customers of financial institutions. Therefore, to prevent endogeneity related to these variables, we consider the level of wealth and clientships of financial institutions in 2000 when none of the households in our sample of Model (1) has a business.

More seriously, there is possible endogeneity concerning our main variable of interest, namely the value of credit from the Village Fund program. For example, business households with already adequate funds for their entrepreneurial activities may have no demand for extra credit from the VF program. In contrast, business households facing financial constraints are more likely to apply for and receive loans from the VF program. Therefore, using the ordinary Probit estimator to evaluate the impacts of the VF program on the likelihood of being credit constrained could yield biased estimates toward null or positive values. Even though, the VF program does, in fact, help reducing financial constraints faced by these households. A similar argument can be extended to the case of business startup model. Households that plan to establish a new business may not demand VF loans at all if they already have sufficient sources of funds, either from their own internal savings or other credit providers that offer higher credit lines. On the contrary, some households may actually have no interest in running a business but use the credit provided by the VF program for consumption. Such exemplified situations can cause negative bias when estimating the effect of the VF program on business startups with the ordinary Probit.

To solve the endogeneity problem associated with the value of loans from the VF program, we construct an instrument from village sizes to help with estimation. Specifically, since the VF program is implemented nationwide, but the seeded fund to each of the villages is the same regardless of the villages size, there exists exogenous variation in the availability of credit per households across all villages in our dataset. Thereby, we create an instrument as the reciprocal of village size as defined by the number of

households in the village. With the available instrument, we apply the mainstream estimation technique of control-function method with the assumption that the endogenous variable VF_i is linear in the instrument and the error terms of the first- and second-stage regressions are jointly Normal. Specifically, the full model is assumed to be:

$$Y_i^j = \mathbb{I}(\beta^j VF_i + \Gamma^j \mathbf{X}_i + \epsilon_i^j \geq 0) \quad (3)$$

$$VF_i = \alpha_0^j + \alpha_1^j Z_i + \mathbf{A}^j \mathbf{X}_i + \eta_i^j \quad (4)$$

$$(\epsilon_i^j, \eta_i^j) \sim N(\bar{0}, \Sigma) \quad (5)$$

where the j superscripts index model start-up (s) or constraint (c); Y_i^j denotes the regressand of the model; and Z_i is the instrument. The control function technique comprises the first-step regression of the endogenous variable on the instrument and the second-step regression as regular Probit with residual from the first step regression of the endogenous variable on the instrument added as another regressor:

$$\Pr\{Y_i^j = 1 | VF_i, \mathbf{X}_i\} = \Phi(\beta^j VF_i + \Gamma^j \mathbf{X}_i + \hat{\eta}_i^j) \quad (6)$$

where $\Phi(\cdot)$ is the cumulative distribution function of Standard Normal, and $\hat{\eta}_i^j$ is the derived residual from regressing the endogenous variable VF_i on the instrument Z_i and controls.

Table 4 reports the descriptive statistics of variables used in our analyses. Panel A of Table 4 shows that out of 58 business households in our data, more than one-fourth of them are financial constrained. Moreover, among 202 households that did not have any business in 2001, one in ten started a new business between 2001–2004. Panel B of Table 4 summarizes the main explanatory variables in our analyses—the value of loans from the VF program. *All* is the value of all outstanding loans from the VF program in the 12-month period prior to the survey. *Exist* is the value of existing loans from the VF program at the time of the survey. The value of the outstanding loans from the VF program for the average households in our data is 10,350 baht (approximately 260 USD). Panel C of Table 4 summarizes the instrumental variable used in this paper—*InvHH*, which is 1,000 divided by the number of households in the village. In our data, the number of households in a village ranges from 29 to 317.

Table 4: Summary statistics

Variables	Obs.	Mean	Median	S.D.
<i>Panel A: Dependent variables</i>				
<i>Constrained</i> (0/1)	58	0.276	0.000	0.451
<i>Startup</i> (0/1)	202	0.099	0.000	0.299
<i>Panel B: Independent variables</i>				
<i>All</i>	240	18.038	12.500	21.563
<i>Exist</i>	240	10.350	8.000	12.384
<i>Panel C: Instrumental variable</i>				
<i>InvHH</i>	240	9.020	6.252	7.368
<i>Panel D: Controls</i>				
<i>MaleHead</i> (0/1)	240	0.704	1.000	0.457
<i>HeadAge</i>	240	53.250	52.000	12.019
<i>HeadEdu</i>	240	5.238	4.000	3.391
<i>NumAdults</i>	240	2.346	2.000	1.235
<i>Relative</i> (0/1)	240	0.771	1.000	0.421
<i>PastWealth</i>	240	12.943	13.024	1.024
<i>PastMemBank</i>	240	0.121	0.000	0.327
<i>PastMemBAAC</i>	240	0.450	0.000	0.499

Note: Unit of observations is household. In Panel A, *Constrained* is a binary variable equals one if the household self-reports credit constraints on its business. *Startup* is a binary variable equals one if the household starts a new business in 2001 or after. In Panel B, values of loans are in thousand baht. *All* is the value of all outstanding loans from the VF program in the 12-month period prior to the survey. *Exist* is the value of existing loans from the VF program at the time of the survey. In Panel C, *InvHH* is the 1,000 divided by the number of households in each village. In Panel D, *MaleHead* is a binary variable equals one if the head of the household is male. *HeadAge* and *HeadEduYear* are the age and the education level of household head, respectively. *NumAdults* is the number of adult members in the household. *Relative* is a binary variable equals one if the household has relatives living in the same village. *PastWealth* is the value of the household's fixed assets in 2000 in logarithmic form. *PastMemBank* is a binary variable equals one if the household was a client of commercial banks in 2000. *PastMemBAAC* is a binary variable equals one if the household was a client of BAAC banks in 2000.

Source: Townsend Thai Project.

The descriptive statistics of control variables are reported in Panel D of Table 4. Around 70 percent of household heads in our data are male. The average household head is 53 years old and has primary-level education. On average, households have two adult members, and 77 percent of households have relatives living in the same village. Around 22.5 percent of households were clients of commercial banks in 2000, while 45 percent of households were clients of the BAAC in 2000.

5 Estimation Results

5.1 Financial Constraints

Table 5 reports the estimated impacts of the Village Fund program on financial constraints faced by household businesses. In our preferred specification, we use the value of all outstanding loans from the VF program in the 12-month period prior to the survey, *All*, as an explanatory variable. Column (1) of Table 5 reports the result from the ordinary Probit estimation. The result suggests that the VF program has no significant impact on financial constraints faced by household businesses. However, as discussed in Section 4, endogenous loan values tend to bias the estimated impact toward null or positive values. Therefore, we use the IV Probit estimation to address the endogeneity problem.

Columns (2) and (3) of Table 5 respectively report the results from the second-stage and the first-stage estimations of the IV Probit estimation. The employed instrument *InvHH* is significantly correlated with the endogenous variable *All*, satisfying the instrumental relevance condition required for a valid instrument. More importantly, the second-stage regression reveals significant impact of the microcredit offered by the VF program on easing financial constraint of business. As a household receives more credit from the VF program, it is less likely to be constrained from expanding its business perceived to yield higher profits. This result is consistent with our hypothesis.

For robustness checks, we use instead the value of existing loans from the VF program, *Exist*, as an explanatory variable. Table 6 shows the results of a robustness check on the impact of the VF program on financial constraints faced by household businesses. Column (1) of Table 6 reports the result from the ordinary Probit estimation. Again, the estimated result is suffered from the endogeneity problem and fails to find any impact of the VF program. Columns (2) and (3) of Table 6 report the results from the IV Probit estimation. The findings are consistent with those from our preferred specification. The result from the first-stage estimation shows that our instrumental variable, *InvHH*, is significantly correlated with the endogenous variable, *Exist*. More importantly, the result from the second-stage estimation confirms that the VF program helps relaxing financial constrained faced by household businesses.

While our finding that the VF program helps provide liquidity to households is consistent with those in Menkhoff and Rungruxsirivorn (2011) and Kaboski and Townsend

Table 5: The Village Fund program and financial constraints

Dep Var = <i>Constrained</i>	Probit		IV Probit			
			2 nd stage		1 st stage	
	(1)		(2)		(3)	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
<i>All</i>	0.009	0.013	-0.048 ***	0.013		
<i>InvHH</i>					1.221 **	0.498
<i>MaleHead</i>	-0.700	0.449	-0.075	0.431	4.155	5.187
<i>HeadAge</i>	0.001	0.021	-0.014	0.017	-0.217	0.245
<i>HeadEdu</i>	-0.021	0.047	-0.019	0.034	-0.057	0.463
<i>PastWealth</i>	-0.261	0.191	-0.226	0.140	-2.093	1.865
<i>NumAdults</i>	0.033	0.201	0.060	0.154	-0.466	2.289
<i>Relative</i>	0.432	0.651	-0.661	0.622	-16.53 *	8.510
<i>PastMemBank</i>	1.038 **	0.427	0.798 **	0.400	7.345	4.680
<i>PastMemBAAC</i>	0.582	0.400	0.340	0.317	1.622	3.939
# of observations	58		58		58	

Note: This table reports the estimated impacts of the Village Fund program on household businesses' propensity to be financially constrained. Robust standard errors are reported. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimation.

(2012), our study contributes to the existing literature in two important aspects. Firstly, we focus on the relaxation of financial constraints faced by household businesses, which is one of the primary objectives of the VF program, rather than on the outcomes such as households' income or consumption. Secondly, our unique dataset allows us to directly observe whether household businesses are financially constrained, instead of indirectly inferring based on the amount of rejected loan applications or the growth of household businesses.

5.2 Business Startups

Table 7 reports the estimated impacts of the Village Fund program on business startups. Again, we use the value of all outstanding loans from the VF program in the 12-month period prior to the survey, *All*, as an explanatory variable. Column (1) of Table 7 shows the result from the ordinary Probit estimation, which suggests that the VF program has

Table 6: The Village Fund program and financial constraints

Dep Var = <i>Constrained</i>	Probit		IV Probit			
			2 nd stage		1 st stage	
	(1)		(2)		(3)	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
<i>Exist</i>	0.020	0.023	-0.087 ***	0.020		
<i>InvHH</i>					0.529 *	0.280
<i>MaleHead</i>	-0.690	0.446	-0.061	0.418	1.645	3.153
<i>HeadAge</i>	0.001	0.021	-0.013	0.016	-0.103	0.136
<i>HeadEdu</i>	-0.028	0.049	0.010	0.035	0.284	0.309
<i>PastWealth</i>	-0.250	0.190	-0.268 *	0.141	-1.728	1.113
<i>NumAdults</i>	0.038	0.205	0.015	0.147	-0.588	1.293
<i>Relative</i>	0.506	0.650	-0.774	0.570	-10.36 **	4.428
<i>PastMemBank</i>	1.055 **	0.433	0.677 *	0.389	3.258	2.736
<i>PastMemBAAC</i>	0.563	0.403	0.392	0.302	1.929	2.269
# of observations	58		58		58	

Note: This table reports the estimated impacts of the Village Fund program on household businesses' propensity to be financially constrained. Robust standard errors are reported. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimation.

negative impact on the number of new businesses. However, this result could also suffer from endogenous loan values. Therefore, we use the IV Probit estimation to address the endogeneity problem and the results from the first-stage and second-stage estimations are reported in columns (2) and (3) of Table 7, respectively. The results show that the VF program does not have any statistically significant impact on the likelihood that potential entrepreneurs will start a new business.

Table 8 reports the results of a robustness check on the impact of the VF program on new business startups. Column (1) of Table 8 shows the result from the ordinary Probit estimation, while Columns (2) and (3) of Table 8 shows the results from the IV Probit estimation. Again, the results from a robustness check are consistent with those from the preferred specification. Firstly, the ordinary Probit estimation is biased due to the endogeneity problem. Secondly, our instrumental variable, *InvHH*, is significantly correlated with the endogenous variable, *Exist*. Lastly and more importantly, the result from the IV Probit estimation confirms that the VF program does not help increase the

Table 7: The Village Fund program and business startups

Dep Var =	Probit		IV Probit			
			2 nd stage		1 st stage	
<i>Startups</i>	(1)		(2)		(3)	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
<i>All</i>	-0.015 **	0.007	-0.038	0.024		
<i>InvHH</i>					0.670 ***	0.196
<i>MaleHead</i>	0.067	0.296	0.112	0.256	1.497	2.687
<i>HeadAge</i>	-0.016	0.013	-0.015	0.013	0.025	0.130
<i>HeadEdu</i>	0.123 ***	0.043	0.125 ***	0.042	0.877	0.580
<i>PastWealth</i>	0.040	0.184	0.076	0.163	2.110	1.462
<i>NumAdults</i>	0.236 ***	0.088	0.258 ***	0.083	1.885	1.224
<i>Relative</i>	0.304	0.347	0.290	0.325	2.029	3.375
<i>PastMemBank</i>	0.226	0.312	0.304	0.274	4.074	4.120
<i>PastMemBAAC</i>	0.187	0.298	0.460	0.419	11.24 ***	2.788
# of observations	202		202		202	

Note: This table reports the estimated impacts of the Village Fund program on households' propensity to start a new business. Robust standard errors are reported. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimation.

number of new business startups.

These findings are contrary to our hypothesis that microcredits enhance households' liquidity condition and, thereby, should allow potential entrepreneurs who were financially constrained to start new businesses. One possible explanation is that loans from the VF program are too small to profitably start a business due to economies of scale or too small to cover lumpy startup costs faced by potential entrepreneurs. While proving that startup costs are indeed lumpy is rarely possible, there is some suggestive evidence in the literature. For example, Banerjee et al. (2015) finds that households in India who receive microcredits lower their consumption of temptation goods (e.g., alcohol, tobacco, or foods consumed outside the home) and increase their durable—and usually lumpy—consumption, such as motorcycles, computers, and cellphones. In addition, Augsburg et al. (2015) finds that the marginal households in Bosnia and Herzegovina who receive microcredits might be able to start a new business in the long run by reducing their consumption and savings in the short run. We view our paper as a complement to

Table 8: The Village Fund program and business startups

Dep Var =	Probit		IV Probit			
			2 nd stage		1 st stage	
<i>Startups</i>	(1)		(2)		(3)	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
<i>Exist</i>	-0.028 **	0.012	-0.066	0.042		
<i>InvHH</i>					0.399 ***	0.121
<i>MaleHead</i>	0.009	0.297	-0.016	0.272	-0.937	1.711
<i>HeadAge</i>	-0.016	0.013	-0.015	0.014	0.018	0.076
<i>HeadEdu</i>	0.129 ***	0.043	0.130 ***	0.043	0.520	0.352
<i>PastWealth</i>	0.027	0.186	0.057	0.166	1.026	0.880
<i>NumAdults</i>	0.244 ***	0.089	0.268 ***	0.084	1.175 *	0.692
<i>Relative</i>	0.264	0.334	0.246	0.314	0.882	1.917
<i>PastMemBank</i>	0.206	0.302	0.284	0.269	2.317	2.511
<i>PastMemBAAC</i>	0.201	0.296	0.446	0.413	6.068 ***	1.659
# of observations	202		202		202	

Note: This table reports the estimated impacts of the Village Fund program on households' propensity to start a new business. Robust standard errors are reported. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimation.

these studies and a contribution to the limited literature on the impacts of microfinance programs specifically on new business startups.

6 Conclusion

In this paper, we use a unique combination of a dataset and a microfinance program to evaluate the impacts of microcredits on households' entrepreneurial activities. Our dataset allows us to directly measure the extent to which household businesses are financially constrained and the rate of new business startups. The One-Million-Baht Village Fund program is also unique on its own. By providing the same amount of seeding fund to every village in Thailand, regardless of the village size, the program provides an exogenous variation in the availability of microcredits. In addition, the size and the coverage of the VF program making it one of the biggest microfinance programs to date.

The results in this paper help shed some lights on the finding in Kaboski and

Townsend (2012) that the VF program increase households' income from businesses. Our findings—that microcredits from the VF program helps relaxing financial constrained faced by household businesses but has no impact on the startups of new household businesses—suggest that the VF program help increase households' business activities on the intensive margin rather than on the extensive margin.

These findings are also consistent with the occupational-choice model with financial frictions and lumpy investment (Kaboski and Townsend, 2011). Microcredit from the VF program could allow constrained entrepreneurs to expand their existing businesses. On the other hand, if microcredit from the VF program is not big enough to cover fixed startup costs, it would not be able to help the potential entrepreneurs start new business. Our results could also shed some light on why some microfinance programs have failed to create new entrepreneurs (Banerjee et al., 2015).

Thus, a policy implication from this study is that microfinance programs aiming to promote entrepreneurial activities might have to offer loans large enough to cover these fixed costs. Considering these findings, the question which follows is how large the loans from microfinance programs need to be in order to effectively promote entrepreneurships? We left this important topic for future research.

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